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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/695,726	10/23/2000	Shing M. Lee	KLA1P012	2746

22434 7590 01/29/2003

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EXAMINER
FERNANDEZ, KALIMAH

ART UNIT	PAPER NUMBER
2881	

DATE MAILED: 01/29/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/695,726	LEE, SHING M.	
	Examiner	Art Unit	
	Kalimah Fernandez	2881	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 September 2002* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,4,6-9,11,12,14-18,21-30,32 and 34* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,4,6-9,11,12,14-18,21-30,32 and 34* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☒ The proposed drawing correction filed on *26 September 2002* is: a)☒ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *10* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The corrected or substitute drawings were received on 9-26-02. These drawings are approved.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims1,4 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Pat No. 4,962,516 issued to Soezima and US Reg. No. H589 issued to Sartore.

3. Soezima discloses a beam generator (11) directed toward sample (10) causing the emission of X-rays from the sample (10) (col.5, lines 15-21).

4. Soezima discloses a first and second wavelength dispersive X-ray detector (18,20) (col.5, lines 22-42).

5. Soezima discloses the first detector detecting X-ray about certain characteristic emission level and the second about different emissions (col.5, lines 30-34).

6. In regards to the recitation "configurable to direct a charged particle beam towards the sample such that the charged particle beam penetrates at least two layers

of the film stack", the recitation does not constitute a positive limitation but only requires the ability to so perform. It does not constitute a limitation in any patentable sense.

7. While, Soezima teaches analyzing the surface state of a sample (see col.1, lines 21-26), the apparatus described in col.5, lines 15-20 is configurable to penetrate at least two layers of the film by adjusting the focus lens (13) to desired depth.

8. Soezima does not explicitly teach the first detector configured to detect X-rays having characteristic emission levels for a top layer of the film stack and the second detector is configured to detect X-rays having characteristic emission levels for an underlying layer that lies beneath the top layer. However, Sartore teaches impinging an electron beam upon a sample wherein x-rays from both the top surface and beneath the surface are detected based upon their different wavelengths (col.2, lines 35-57; fig. 2).

9. It would have been obvious to ordinary artisan to incorporate the teachings of Sartore into Soezima since Sartore teaches high accuracy without causing sufficient demage (col.1, lines 39-44).

10. As per claims 4, Soezima discloses a first wavelength dispersive system having crystal (17) (i.e. reflective surface) and detector (18) (col.5, lines 25-27).

11. As per claim 31, Soezima teaches a characteristic emission level corresponding to the surface layer of a sample (col.22, lines 39-53).

12. Claim 1,4, 11,15-17,21-22,24,26-27,29, 32 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soezima '516 and in view of US Pat No 5,210,414 issued to Wallace et al.

13. Soezima teaches an apparatus having a beam generator (11) direct a charged particle beam towards a sample (10). Soezima teaches a first and second wavelength dispersive X-ray detectors positioned above the sample (see fig.5; col.5, lines 15-53).

14. Soezima does not teach causing the charged particle beam to penetrate at least two layers of the film.

15. However, Wallace et al teaches the varying the accelerating voltages of an electron beam to facilitate surface analysis at depths (see col.2, line 56-col.3, line 15;col.4, lines 53-62).

16. Wallace et al teaches the use of wavelength-dispersive X-ray spectrometry for analyzing heavy elements (col.4, lines 65-68).

17. It would have been obvious to an ordinary artisan to combine Soezima and Wallace et al since Wallace et al discloses the ability to differential analyze a sample without causing damage (col.2, lines 12-21).

18. As per claims 1 and 11, Soezima discloses the first detector detecting X-ray about certain characteristic emission levels and the second about different emission levels (col.5, lines 30-34).

19. As per claim 15, Soezima discloses a second detector being a wavelength dispersive spectrometer (20).

20. As per claim 16, Wallace et al teaches selection of a beam acceleration energy and current at which the charged particle beam will be produced (col.5, lines 8-22; col.6, lines 45-52).

21. As per claim 17, Soezima teaches collection and analysis of data from detected X-rays (col.5, lines 53-64).

22. As per claims 21 and 26, Wallace et al teaches calculation of predicted data by solving equation described in detail start in col.6.

23. Wallace et al, further, teaches the comparison of raw data with the predictions (see col.10, lines 28-41). Note, Wallace et al teaches the comparison using EDX data, however Wallace et al discloses the applying the method for lower energies with wavelength dispersive spectrometry (col.11, lines 5-13).

24. As per claims 22 and 27, Wallace et al teaches the calculation of standard deviation of the raw with the comparison of the predicted model (see fig.3; col.10, lines 55-68).

25. As per claims 24 and 29, Wallace et al teaches representation of thickness and composition (col.5, lines 43-48).

26. As per claims 32 and 34, Wallace et al teaches differential surface composition analysis (col.2, line 56- col.3, line 15).

27. Claims 6-7,9,18,25, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soezima and Wallace et al as applied to claim 1 above, and further in view of US Pat No 5,703,361 issued to Sartore.

28. The obvious combination of Soezima and Wallace et al has been discusses except for a processor linked to the beam generator and the first detector. In addition, no discussion of a conductive and liner layer.

29. Soezima teaches a processor (29) operated to store and analyze detected data.

30. Neither, Soezima and Wallace et al teach a processor linked to the beam generator and the first detector.

31. However, Sartore teaches a processor (17) linked to the SEM apparatus (15) (i.e. the beam generator) and a X-ray detector (16) to enable an accuracy determination of the X-ray extraction location (see col.3, lines 21-26, lines 38-50).

32. It would have been obvious to an ordinary artisan to incorporate the teachings of Sartore into the obvious combination of Soezima and Wallace et al.

33. Namely, obvious motivation flows from Sartore's disclosure of advantage of linking the processor to SEM and the detector cited in col.5, lines 7-20. Moreover, Sartore teaches the improved accuracy in image mapping.

34. As per claims 6,18,25 and 30, Sartore teaches a conductive layer (12) and an insulation layer (13) (i.e., liner layer) (see col.4, lines 53-60).

35. Claims 2,8,12,14, 23, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Soezima and Wallace et al as applied to claim 1,11 and 26 above, and further in view of US Pat No. 5,926,522 issued to McCarthy et al.

36. The obvious combination of Soezima and Wallace et al has been discussed except for detecting X-rays of a specific energy level.

37. However, McCarthy et al teaches a wavelength dispersive X-ray spectrometer having a polycapillary optic for collecting X-rays over a energy range from 100eV to 10,000eV (col. 2, lines 50-56). McCarthy et al teaches the X-ray detector (28) being configured to detect over the entire energy range (col.4, lines 30-36).

38. It would have been obvious to an ordinary artisan to incorporate the teachings of McCarthy et al into the obvious combination of Soezima and Wallace et al since McCarthy et al discloses the advantage of low electron beam currents (col.2, lines 1-19) and improved energy range (col.6, lines 45-54).

39. As per claim 8, Soezima teaches a processor (29).

40. As per claims 23 and 28, Mc Carthy et al teaches the conventional count value analysis (col.6, lines 55-67;see figs.6-10).

Response to Arguments

1. Applicant's arguments filed 9-26-02 have been fully considered but they are not persuasive. Applicant argues that Soezima's teaching of analyzing the state of an element in a specimen fails to read on the claimed invention. It is pointed out that claims 1,11,21 and 26 require the measuring of film stack characteristics of a sample; nowhere does the claim language preclude the analysis of a single element in the film stack of a sample.

2. In addition, the broadest interpretation of the claim language dictates that one characteristic of the film stack is the state of elements within the sample, wherein Santore and Wallace et al teaches detection of x-rays in different layers of the sample.

3. In response to Applicant's argument that there is no suggestion to combine the references, the Examiner recognizes that references cannot be arbitrarily combined and that there must be some reason why one skilled in the art would be motivated to make the proposed combination of primary and secondary references. However, there is no

requirement that a motivation to make the modification be expressly articulated. The test for combining references is what the combination of disclosures taken as a whole would suggest to one of ordinary skill in the art. References are evaluated by what they suggest to one versed in the art, rather than by their specific disclosures. In this case, the difference in the application of the inventions of Soezima and Wallace does not constitute no motivation to combine. In fact that Wallace et al applies SEM-XRS to epidemiological studies does not constitute a departure from his techniques in analyzing semiconductor and an ordinary artisan would have obvious motivation to combine when viewed as a whole.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kalimah Fernandez whose telephone number is 703-305-6310. The examiner can normally be reached on Mon-Thus between 8:30am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Lee can be reached on 703-308-4116. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9318 for regular communications and 703-872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

kf
January 14, 2003

JOHN R. LEE
SUPERVISORY PATENT EXAMINER
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